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A

FATHER'S PRESENT

TO HIS

CHILDREN.

LONDON:
R. D. COMPTON, TYP. 55, PADDINGTON STREET.

1847.

47. 1136.

A
FATHER'S PRESENT
TO HIS
CHILDREN,

TO ASSIST THEM IN ATTAINING A KNOWLEDGE OF
CALCULATION.

B. Isaac

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LONDON.
W. H. COMPTON, PRINTER, 55, PADDINGTON STREET.

1847.

LONDON:
W. H. COMPTON, PRINTER, 55, PADDINGTON ST., MARYLEBONE.

PREFACE.

February, 1847.

MY DEAR CHILDREN:

"Grace, mercy, and peace be with you."

Some time since it came into my mind to put together a little information to assist you in the pleasing science of numbers, or what is generally called Arithmetic. I have endeavoured to do so in the best way I could, and in the most pleasing manner. The little information respecting various matters I hope will please, and rather draw to the study of figures than weary you in the undertaking. The Lord only knows in what line of life you may be called to move in, and the knowledge of calculation may be of service to you; and should this little work be acceptable, I will, for your further information gather up whatever comes in my way, and, at a future day, if spared, present it.

But after all your knowledge of numbers there will be a time when all earthly science will decay and die, and then to have a knowledge that we are numbered among that number which no man can number, as stated in Revelation, 6th chapter, 9th verse, will be a mercy indeed.

MY DEAR CHILDREN,
I remain,
Your affectionate Father,
B. ISAAC.

6, *York Terrace, Kingsland Road.*

A

FATHER'S PRESENT TO HIS CHILDREN.

SIMPLE ADDITION

Teaches to find the full or total amount of sums in quantities of the same name.

	£	Oranges.	Apples.	Peaches.	Plums.
	1	21	171	124734	562163
	2	12	239	642943	21964
	3	33	713	726574	563
	4	17	604	812973	21
	5	49	830	864443	18536
	6	54	135	963672	4340
	7	11	466	347365	279
Total	28	197			

Cherries.	Pears.	Walnuts.
17964017	87463	16729429
43706123	65498	12090736
94218749	16473	67342617
29991815	5642	74298064
58997252	59376	29020721
55122753	12421	41739402

The several numbers to be added together being set down in regular order, as seen above, they are to be added together; beginning at the bottom figure on the right hand, and proceeding upwards, till you have added all the figures in one column together; then place the first figure on the right hand, or unit figure, of the sum so found, under the same column, carrying the remaining figure or figures, if any, to be added to the next column; having discovered the amount of the second column, place the unit figure also under the same column, adding the other figure or figures to the next column, proceeding in this manner till the whole be finished, and setting down the total amount of the last column under the same.—Thus, in the first example, I say 1 and 4 are 5, and 9 are 14, and 7 are 21, and 3 are 24, and 2 are 26, and 1 are 27. This being the amount of the first column, I set down 7, (which is the figure in the place of units), under the same column, and carry the remaining figure 2 to be added to the next column, saying 2 and 1 are 3, and 5 are 8, and 4 are 12, and 1 are 13, and 3 are 16, and 1 are 17, and 2 are 19, the whole amount of the last column, wherefore I set it down under the column, and the total is thus found to be 197.

MONEY TABLE.

¼ is a farthing, or quarter of any thing; ½ is a halfpenny, or half of any thing; ¾ is three farthings, or three quarters of any thing.

FARTHINGS.				PENCE.				SHILLINGS.			
		s.	d.			s.	d.			£	s.
4	are	0	1	20	are	1	8	20	are	1	0
5	. .	0	1¼	30	. .	2	6	30	. .	1	10
6	. .	0	1½	40	. .	3	4	40	. .	2	0
7	. .	0	1¾	50	. .	4	2	50	. .	2	10
8	. .	0	2	60	. .	5	0	60	. .	3	0
9	. .	0	2¼	70	. .	5	10	80	. .	4	0
10	. .	0	2½	80	. .	6	8	100	. .	5	0
11	. .	0	2¾	90	. .	7	6	120	. .	6	0
12	. .	0	3	100	. .	8	4	140	. .	7	0
16	. .	0	4	120	. .	10	0	160	. .	8	0
20	. .	0	5	132	. .	11	0	180	. .	9	0
24	. .	0	6	144	. .	12	0	200	. .	10	0

COMPOUND ADDITION.

Place the pounds, shillings, and pence one under the other, then beginning with the farthings, (if there be any), as before, and for every four or penny they contain, carry one to the pence, and set down the odds; add the pence in the same manner, and carry one for every shilling or 12 pence, to a shilling, and set down the odds, next add the shillings, and carry one for every pound, or 20 shillings, to the pound, placing down the odds, as before. Lastly, add the pounds, as in abstract numbers, carry one for every ten, and you have the sum required.

£.	s.	*d.*
5	7	9
12	0	2
1	6	10
0	7	9
20	10	4
3	15	11
2	7	2
6	19	11
52	15	10
47	8	1
52	15	10

£.	s.	*d.*
27	9	4½
136	4	0¼
124	11	3
90	7	9¼
166	19	11¾
101	7	9½
24	0	0½
107	15	6

£.	s.	d.
240	17	6½
196	11	8¾
65	0	6
214	17	10¾
641	5	0¾
493	16	2
123	10	5¼
11	0	1

Thus, in the first of three foregoing examples, I begin with the unit figures of the lowest denomination, which is pence, saying, 1 and 2 are 3, and 1 are 4, and 4 are 8, and 9 are 17, and 2 are 19, and 9 are 28; to which I add the tens in the same column, saying, 28 and 10 are 38, and 10 are 48, and 10 are 58; now, by the pence table, I know that 50 pence are 4 shillings and 2 pence, therefore 58 pence are 4 shillings and 10 pence: thus, I must set down the 10 pence, which is the overplus, under the same column; and the 4 shillings, which are 4 units of the next higher denomination, I carry to be added to the next denomination, saying, 4 and 9 are 13, and 7 are 20, and 5 are 25, and 7 are 32, and 6 are 38, and 7 are 45; to which I add the tens, saying, 45 and 10 are 55, and 10 are 65, and 10 are 75: now, by the shilling table, I find that 75 shillings are 3 pounds 15 shillings; the 15 shillings are to be set under the column of shillings, and the 3 pounds being units of the next denomination, viz. pounds, are to be added thereto: and the pounds, being the left and highest denomination, are to be added together as simple numbers of one denomination, and the total placed under the same: thus the total is found to be 52*l.* 15s. 10d.

£.	s.	d.
9876	13	9
2407	6	7½
1873	19	4¼
2056	12	8¾
1879	14	6¼
2046	9	5
2476	13	9½
1000	0	0

£.	s.	d.
8793	13	6½
2307	6	9¼
1943	15	7¾
2075	8	0
2100	19	11¼
2698	0	7¾
4567	18	2½
1000	0	0

£.	s.	d.
3896	12	8½
1245	9	2¼
3601	11	3
9876	4	11½
1295	13	7¼
2317	18	6¾
6503	9	3½
1894	16	7¾

£.	s.	d.
1264	15	8¾
198	16	10½
1042	17	6¼
451	10	11½
2382	12	0
643	9	10
2124	10	8¾

£.	s.	d.
1326	10	8¼
426	18	10¾
2198	15	11½
621	6	5
4982	17	11½
427	19	11¾
1000	0	0

£.	s.	d.
1062	10	3¾
2119	19	6½
1164	12	11¼
1249	2	3¾
2115	6	10
4103	7	6¼
2146	13	8½

£.	s.	d.
472	7	4½
19	2	0
145	19	10¼
7	0	1
0	10	6½
27	8	2
30	7	9¼
145	0	4
301	10	10
29	7	2½
6	6	0

£.	s.	d.
1762	9	6½
1000	3	3
10	10	6¼
12	9	3
17	4	0¾
123	18	0½
129	0	0
71	6	9½
41	2	11
7	4	2¼
8	8	0

£.	s.	d.
179	9	9½
184	19	0¼
200	7	9
301	8	10½
401	6	4½
21	8	7¾
33	0	0¼
12	12	0½
19	4	4
8	8	0¼
6	12	10½

ADDITION OF AVOIRDUPOIS WEIGHT.

By the weight of Avoirdupois are weighed all kinds of goods whatever, except precious stones, gold and silver.

There is what is called the greater and the less avoirdupois. The greater consists of hundreds, quarters, and pounds; and the less avoirdupois is divided into pounds, ounces, and drams. To assist you, I will lay the table of avoirdupois before you.

4 quarters make	1 dram, the mark of which is	dr.
16 drams	1 ounce	oz.
16 ounces	1 pound	lb.
28 pounds	1 quarter of a hundred weight	qr.
4 quarters	1 hundred weight	C.
20 hundred weight	1 ton	T.

C.	qrs.	lb.
7	3	12
12	0	9
13	2	7
37	1	0
8	2	7
40	0	20
1	3	0
2	0	7
123	1	6

C.	qrs.	lb.
24	2	4
10	0	9
0	1	20
24	2	0
36	3	21
40	2	0
50	1	22
40	0	19

lb.	oz.	dr.
9	9	10
20	13	14
37	12	0
49	4	7
62	0	1
10	7	0
11	6	7
14	0	12

These examples are wrought in the same manner as the former; but having regard to the avoirdupois table, instead of the pence table. And the number of units in each column, which compose a unit in the next higher column, is placed at the head of the column: thus, in the first example, as 28 is the number of pounds which form one quarter of a hundred, it is placed over the column of pounds; and 4, which is the number of quarters. And in the last example, 16 being the number of drams; and, as 16 ounces form a pound, 16 is placed over the column of ounces; and the like is observed in addition of other weights and measures. In the first of these examples the number of pounds in the first column is 62, which is 2 quarters, and 6 pounds over; the 6 is to be set under the pounds, and the 2 quarters added to the column of quarters, which, with the amount of the whole column, is 13 quarters, which is 3 hundreds and 1 quarter; the 1 quarter is to be set under the quarters, and the 3 hundreds added to the next column, and the whole amount is found to be 123 c. 1 qr. 6 lb.

ADDITION OF TROY WEIGHT.

24 grains . . . make . 1 pennyweight.
20 pennyweights . . . . 1 ounce.
12 ounces . . . . 1 pound troy.

By this weight are weighed gold, silver, and precious stones. The usual denominations are pounds, ounces, pennyweights, and grains.

EXAMPLES OF TROY WEIGHT.

lb.	oz.	dwt.	gr.	lb.	oz.	dwt.	gr.	lb.	oz.	dwt.	gr.
4	9	1	17	12	7	11	21	32	9	2	20
2	7	19	7	14	8	12	19	154	8	1	0
7	0	17	8	12	2	0	8	47	0	19	21
1	2	12	9	19	10	19	7	39	2	12	12
0	10	14	20	20	11	7	12	249	4	10	10
4	11	10	11	7	10	10	15	347	7	0	9
7	4	3	2	14	0	6	12	558	9	19	1

It is customary for the goldsmiths to divide the pound in 12 marks, instead of ounces; and each mark in 24 carats; and each carat into 4 grains.

You will perceive, my dear children, that these examples are wrought according to the general rule given in the former part of this section, and in the same manner as addition of avoirdupois; but you must pay a strict regard to the table, and to the figures at the head of each column.

You must also note that the pound avoirdupois is heavier than the pound troy; but the troy ounce is heavier than the avoirdupois ounce, for 1lb. 2oz. 12dwt. troy is equal to a pound avoirdupois; and a pound troy is about 13oz. 2½drms. avoirdupois.

And I may also observe that it is unnecessary to give examples of the other parts of addition concerning apothecaries' weight, liquid, dry, and long measure, &c., as the same method serves for all of them, having respect to the table belonging to each.

SUBTRACTION.

We shall now go on to Subtraction, vulgarly called Substraction, which teacheth how to take a less number from a greater; and sheweth the remainder, excess or difference. Thus, if I take 7 from 9 there will remain 2.

Rule.—Place the less number under the greater; observing that the figures of each denomination in the less number stand directly under the figures of the same denomination in the greater number—that is, the units under units, tens under tens, and pounds, shillings, pence, ounces, drams, &c., &c., directly under the same, as in addition. Then, beginning at the right hand, or the least denomination, take the value of each figure in the less number from that in the greater number, which stands directly over it; setting down the remainder underneath. Proceed in this manner till the work be finished. But if, as it frequently happens, any single figure in the less number be greater than that in the greater number, from which it is to be taken, a unit is to be borrowed from the next figure towards the left hand of the greater number, and added to the uppermost figure, that the bottom figure may be taken therefrom; which borrowed unit must be paid, or added to the next figure of the less number on the left hand.

From	6954	1729886	370290370
Take	5443	1098907	128403493
Rem.	1511		
Proof	6954		

I will now show you the use of this rule, by supposing a merchant owed 6954 pounds, whereof he had paid 5443 pounds. To know what remains to be paid, the sums are to be set orderly one under the other, according to the foregoing rule, used as seen in the examples; then begining with the unit figures, in the first example, I say, take 3 from 4 and there remains 1, which I set under the line; next take 4 from 5 and there remains 1, which is also set under the line; again, take 4 from 9 and there remains 5, which must be set down as before; and lastly, take 5 from 6 and there remains due 1511 pounds.

Subtraction is proved by adding the remainder to the less of the two given numbers, and if the total of these two numbers amount to the exact sum of the greater number the work is right, otherwise not; thus, in this example, I add the remainder 1511*l.* to the less number, 5443*l.*, and the amount is 6954*l.*, the same as the greater number.

MORE EXAMPLES.

178927	2257490	13942683	626467464
147839	1147863	12451492	417148345

We come now to—

COMPOUND SUBTRACTION,

Which is the method of deducting one compound number from another; and, as in Compound Addition, care must be taken to place the different denominations under each other in separate columns; the smaller number under the greater, as in simple subtraction. I will now lay before you some examples in

SUBTRACTION OF MONEY.

Suppose I take £27. 17s. 8¾d. from 36*l.* 14s. 5½d. what will be the difference?

£.	s.	d.
36	14	5½
27	17	8¾
8	16	8¾
36	14	5½

Now to make this plain and easy, we lay before you the following—commencing to subtract at the lowest term. We have here 3 farthings to take from 2. But this we cannot do; we therefore borrow a penny, which is 4 farthings, and adding these to the 2 farthings, make 6 ; then 3 from 6, there remain 3, which is written down under the farthings. We now repay the penny borrowed by adding or carrying 1 to the 8 pence. There is thus 9 pence to subtract from 5 ; but since this cannot be done, we borrow a shilling which is 12 pence, and adding 12 to the 5, we make 17, from which taking 9, 8 remains, which is placed under the pence. The borrowed shilling is also repaid by adding 1 to the lower amount in the shilling column, namely, the 17, making thus 18 to be taken from 14, but as we cannot do this either, we borrow one pound, which is 20 shillings, 20 being added to 14, gives 34 ; then 18 from 34, there remain 16. This is placed under the shillings, and 1 is carried to the lower amount of pounds, which are then subtracted, as in simple subtraction ; thus, 1 to 7 is 8, 8 from 6 cannot, but 8 from 16, there remain 8 ; then 1 to 2 is 3, and 3 from 3 nothing remains.

MORE EXAMPLES.

£.	s.	d.	£.	s.	d.	£.	s.	d	£.	s.	d.
25	18	7½	50	19	9¾	38	19	6½	17	10	9½
13	5	4¼	16	18	10½	17	18	7¾	15	9	11¾

£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
317	5	6¼	587	2	7½	9080	0	0	2050	17	10¼
65	17	8½	309	19	11¾	2794	16	2¼	1980	18	11½

What is the difference between 6000*l.* and the following sums :—2762*l.* 10s. 8d. ; 56*l.* 10s. ; 145*l.* 0s. 6¼d. ; 4444*l.* 4s. 4d.

£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
6000	0	0	6000	0	0	6000	0	0	6000	0	0
2762	10	8	56	10	0	145	0	6¼	4444	4	4

I hope my dear children will by these examples be led to see a little into what is called Subtraction of Money, and with the two following examples (should the money be paid at several times, the sums so paid are to be added together, and the total subtracted from the sum first due). I shall dismiss this rule for the present.

	£.	s.	d.
Due . .	145	19	6
Paid at several times.	2	0	0
	10	10	0
	30	9	8
	0	10	6
	3	9	4
	12	0	6
Paid in all			
Rest due			
Proof			

	£.	s.	d.
Received .	1120	10	0
Paid to several persons.	2	0	0
	0	10	6
	10	8	8
	12	12	0
	20	19	10
	9	0	0
Paid in all			
Rest due			
Proof			

Be sure you do not forget your rules and tables, and to prevent this say them often to yourself, or to one of your schoolfellows. By attention to this you will save yourself and others a great deal of trouble.

EXAMPLES IN AVOIRDUPOIS WEIGHT.

	C.	qrs.	lb.	C.	qrs.	lb.	C.	qrs.	lb.
From	12	3	20	147	2	9	19	3	14
Take	10	2	21	116	3	12	12	2	15
Rem.	2	0	27						
Proof.	12	3	20						

TROY WEIGHT.

	lb.	oz.	dwt.	gr.	oz.	dwt.	gr.
From	336	10	18	20	3124	16	21
Take	247	11	19	22	220	19	22

These examples, and all others of other denominations, are wrought in the same manner as subtraction of money, having respect to the table belonging to the denomination : thus in the first example of avoirdupois weight, I say, take 21 pounds from 20 I cannot, wherefore I borrow 1 quarter of an hundred from the 3 quarters, and add it to the 20, which makes 48 pounds ; then I say, 21 from 48 and there remains 27 ; next, 1, that I borrowed, and 2 are 3, 3 from 3 I cannot, wherefore I set down 0, as before hinted ; lastly, 10 from 12 and there remains 2.

SIMPLE MULTIPLICATION.

We come now to Simple Multiplication, which is nothing more than a short method of performing addition, for instead of adding up, it is only to multiply, and the sum is done. Yet, perhaps, it is the most necessary rule in arithmetic for business. on account of its dispatch in resolving several long questions.

Multiplication teaches how from two given numbers to find a third, that shall contain either of the two given numbers, as often as the other contains units : thus, 3 times 4 are 12 ; here 3 and 4 are the two given numbers, and 12 is the third number, or product, which contains 3 as often as 4 contains units, viz. 4 times ; or it contains 4 as often as 3 contains units, 3 times.

There are three ends principally to be multiplication :—First; It serves to bring the greater denominations of money weight, or measures, into small ones ; as pounds into shillings, pence, and farthings ; hundred weights into pounds, ounces, or drams ; miles into yards, feet, barley-corns, &c. Secondly ; Having the length and breadth of a plain surface, we find its contents. Thirdly; Having the rate or value of any one thing, we know the rate or value of any number of such things, however great. But before the learner can begin this rule, it is absolutely necessary that he have the multiplication table perfectly by heart.

In multiplication please to observe there are three terms, as follows :—

The Multiplicand, 12, or sum to be multiplied.
Multiplier, 10

Product, 120, because 10 times 12 are 120.

Again, Multiplicand, 1209
Multiplier, 12

Product, 14508

In this example, the multiplier being 12, I say 12 times 9 are 108, wherefore I set down 8, the units of this product, and carry 10 to be added to the next product, saying, 12 times 0, or 12 times nothing is nothing, thus I have no product from this figure, wherefore I set down the unit figure of the 10 I carried to be added to this product which is 0, and carry the remaining 1 to be added to the next product; saying 12 times 12 (as the two next figures in the multiplicand is 12) are 144, and the 1 I carried makes 145; wherefore I set it down, being the product of the last figures. And the whole product of 1209, multiplied by 12, is 14508.

$$\begin{array}{r}2604376\\5\\\hline 13021880\\\hline\end{array}\qquad\begin{array}{r}8209046\\7\end{array}\qquad\begin{array}{r}21098340\\9\end{array}\qquad\begin{array}{r}1209\\12\end{array}$$

$$\begin{array}{r}1097012\\32\\\hline 2194024\\3291036\\\hline 35104384\\\hline\end{array}\qquad\begin{array}{r}2639854\\3062\end{array}\qquad\begin{array}{r}24365483\\647\end{array}$$

$$\begin{array}{r}857698\\7680\end{array}\qquad\begin{array}{r}786804768\\806009\end{array}$$

$$\begin{array}{rcrl}135243 & & & \\ 5324 & & & \\ \hline 540972 & . & 4 & \text{times the Multiplicand.}\\ 270486 & . & 20 & \text{times ditto.}\\ 405729 & . & 300 & \text{times ditto.}\\ 676215 & . & 5000 & \text{times ditto.}\\ \hline 720033732 & . & 5324 & \text{times ditto, or the answer.}\\ \hline\end{array}$$

COMPOUND MULTIPLICATION.

Compound Multiplication teaches the method of multiplying sums or quantities of more than one denomination: and be pleased to recollect that to find the price of a $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$, take parts of the given price, and add them up with the other figures.

Multiplication of divers denominations is either single or compound; single, when the multiplier consists of 12 or less, and is performed by one multiplier; compound, when the multiplier consists of more than 12, and requires more than one multiplier.

EXAMPLE.

£	s.	d.
9	10	8
		8
£76	5	4

In this example I begin with the pence, saying 8 times 8 are 64, which is 5 shillings and 4 pence; the 4 pence I set down under the pence, and carry the 5 shillings to be added to the product of shillings, saying, 8 times 10 is 80, and 5 is 85, or 4*l.* 5s., the 5 shillings I set under the shillings, and carry the 4*l.* to the next product; then 8 times 9, are 72 and 4 is 76.

The work is proved by the following example, (viz.) by dividing the multiplier in half, and multiplying by one half, and the product by 2.

PROOF.

£	s.	d.
9	10	8
		4
38	2	8
		2
£76	5	4

But in compound multiplication of divers denominations, or when the multiplier is more than 12, the multiplier is to be resolved into its two commensurable parts, if it be a commensurable number, and the multiplicand multiplied by one of those parts, and that product by the other part: thus, if the multiplier be 36, I multiply by 6, and also the product thence arising by 6, which are the two commensurable parts; for 6 times 6 are 36.

But if the multiplier be not a commensurable number, or one which cannot be resolved into parts exactly, then the next lower number which is a commensurable one is to be taken, and the multiplicand multiplied by the two parts as before, and the multiplicand multiplied by the overplus, and that product added to the last product, as in the number 46. This number cannot be resolved exactly into two, or three commensurable parts, there being no such number in the multiplication table, wherefore I take the next lower commensurable number, 45, because 5 times 9 are 45, and multiply by these two numbers, and the multiplicand by 1, which must be added to the product.

£	s.	d.
7	14	6
		6
46	7	0
		6
£ 278	2	0

PROOF.

£	s.	d.
7	14	6
		3
23	3	6
		6
139	1	0
		2
£278	2	0

I hope, my dear children, you will look well to this rule, as it is of very great importance you should understand it; and for your further practice I will add a few more examples.

Multiply £17. 13s. 6d. by 23.

You will now multiply in the first place by 10, and by 2, and then multiply the original sum by 3, and add it.

£.	s.	d.	
17	13	6	× 3
		10	
176	15	0	
		2	
353	10	0	
53	0	6	
£406	10	6	

Multiply £476. 10s. 8¼d. by 5.

£.	s.	d.
476	10	8¼
		5

If 1 stone of goods cost £4. 13s. 8¼d. what will 6 stone cost?

£.	s.	d.
4	13	8¼
		6

If I give 15s. 8d. for 1 yard of cloth, what will 8 yards cost?

s.	d.
15	8
	8

If 1 cwt. of sugar cost £2. 3s. 10d. what will 10 cwt. cost?

£.	s.	d.
2	3	10
		10

If 1 ℔ of tea cost 4s. 5d. what will 24 ℔s. cost ?

s. d.
4 5
6

Or, thus,
s. d.
4 5
8

If 1 ell cost 8s. 11d. what will 72 ells cost ?

s. d.
8 11
8

I 1 score of goods cost £1. 13s. 5d. what will 34 cost ?

£. s. d.
1 13 5 × 2
8

Or, thus,
£. s. d.
1 13 5
7

If 1 ℔. of sugar cost 5½d. what will 112 ℔. cost ?

d.
5½
10

If 1 yard of cloth cost 5s. 7d. what will 468 yards cost ?

s. d.
5 7
10

If 1 ℔. of goods cost 9s. 7d. what will 3476 ℔s. cost ?

s. d.
9 7 × 6
10

I should have informed you, that when it is above 1000 (and under 10,000 get the price of 1000 (by multiplying by 10, 10, and 10), and then out of these parts get what remains, in a manner similar to that just performed.

I should wish you to work the following sums, and then we will go one step further.

What is the superficial contents of a piece of ground, whose breadth is 10274 feet, and length 24640.

24640
10274

Here I multiply the length by the breadth (which is the general rule in superficial measure) and the product is 253151360 square feet, for the answer.

How many solid feet does a piece of timber contain that is 40 feet in length, 4 in breadth, and 3 in depth ?

40
4

Here the general rule is, to multiply the length by the breadth, and the product is 480 solid feet, the answer.

The next rule we come to is the last of what is commonly called the four first rules, which is

SIMPLE DIVISION,

And Simple Division shows how often one number is contained in another, and you must remember—

First, The Divisor is the number you divide by;

Secondly, The Dividend is the number to be divided; and

Thirdly, The Quotient is the number produced by division; and what is over is called the remainder.

Divide 347965 by 2.

I will now place down the division, dividend, and remainder.

```
2)347965(1
  ───────
   173982 quotient.
        2 divisor.
   ──────
   347965 dividend.
   ──────
```

Here I say 2 in 3, one over, which I carry to the 4, and say twos in 14, 7, and say twos in 7, 3 and 1 over, which I carry to the 9, and say twos in 19, and so on; and I prove it by multiplication.

EXAMPLE THE SECOND.

Divide 69 by 3.

```
3)69(23
  6
  ─
   9
   9
  ─
```

This question is wrought out by examining how many times 3 is in 6, and finding it to be twice, we place 2 on the right side; we then multiply the divisor, 3, by 2, the quotient, subtracting the product, 6, from the 6 of the dividend, nothing, we bring down the 9 and proceed with it in the same manner.

EXAMPLE THE THIRD.

Divide 7958 by 6, as follows.

6)7958(1326 2-6ths
6
—
19
18
—
15
12
—
38
36
—
2 2-6ths
—

In commencing we find that there is only one 6 in 7, and 1 over; we therefore write 1 in the quotient, and multiplying the divisor, 6, by 1, the quotient, and multiplying the divisor 6, by 7 of the dividend. To the remainder, 1, we bring down 9, the next figure of the dividend, making 19. As we find there are 3 times 6 in 19, we place the 3 in the quotient, and multiplying the divisor 6, by 3, subtract the product 18, from 19, which leaves 1, as before. To this 1 we bring down the 5, making 15; and find there are twice 6 in 15, we place 2 in the quotient, and multiplying 6 by 2, subtract 12, the product, from 15, leaving 3. To this 3 we bring down 8, making 38, in which there are 6 sixes, therefore, placing 6 in the quotient, we multiply 6 by 6, and subtract 36, the product, from 38, leaving 2 over. Here the account terminates, it being found that there are 1326 sixes in 7958, with a remainder of 2 over, written as 2-6ths.

The above mode of working is called Long Division, and is seldom adopted by skilful arithmeticians, at least in numbers below 12; they generally pursue a plan of working out parts of the question in the mind, called Short Division. They would, for example, treat the above question as here shown:—

6)7958
—
1326-2
—

The over number of 1 from the 7 is carried in the mind to the 9, making 19; the 1 from 19 is in the same manner carried to the 5, and the 3 from it is carried to the 8, leaving the remainder 2.

Questions in division may be proved by multiplying the quotient by the divisor: thus, taking the last example, we multiply 1326 by 6, bringing the remainder of 2, as follows:

```
1326 + 2
   6
────
7958
────
```

```
365)13534953023(37082063
    1095
    ────
     2584
     2555
     ────
      2995
      2920
      ────
       753
       730
       ───
       2302
       2190
       ────
        1123
        1095
        ────
          28
          ──
```

PROOF.

```
   37082063
        365
───────────
  185410315
 222492378
111246189
         28
───────────
13534953023
───────────
```

I would just remind you, that division is reckoned the last of the four simple rules, because it can be performed without the help of the other three. Multiplication is considered the third because it cannot be performed without the aid of addition; and sometimes subtraction is the second, because it requires the help of addition; and addition is called the first rule because it is performed without the aid of any of the others.

COMPOUND DIVISION.

Compound Division is the method of dividing a compound number into any given number of equal parts. Thus, to divide £8. 12s. 10d. by 4, that is into four equal parts, is an operation in compound division.

```
      £.     s.    d.   £.   s.  d.          £.  s.   d.
  24)437    19    10(18    4   11¾          2)4   7   6½
     24     ——    ——                        ————————————
    ——     119   286                           2   3   9¼
    197     96   264                                   2
    192     —    ——                         ————————————
    ——      23    22                Proof   £4   7   6½
      5     —     —                         ————————————
     —
```

In this example, I first divide the £437. by 24, the quotient of which is £18, and there remains £5, which, added to the 19s. makes 119, for a new dividend; then the divisor is contained 4 times in 119, wherefore I set down 4s. as the quotient, and 23s. remain, which added to the 10d. make 286d. for the next dividend; in which the divisor is contained 11 times, and there remain 22d, or 88 farthings, in which the divisor is contained 3 times. Thus the quotient is £18. 4s. 11¾d, and there remain 16 farthings.

Sums of this nature may also be more expeditiously wrought if the divisor be a commensurable number, and can be resolved into two parts, as in the following examples:—

1. If the expense of a country feast be £263. 10s. 6d., to be paid by 28 stewards, what must each steward pay?

In this example I divide by 4, and the quotient thence arising by 7, which is equal to dividing by 28, and the answer is found to be £9. 8s. 2d. for each steward to pay.

2. If a gentleman spends £347. 15s. 9d. in the space of 1 year and 8 weeks, it is desired to know how much it is per week on an average?

Here I divide the whole sum by 5, and the quotient thence arising by 6, and that quotient by 2; which is equal to dividing by 60 (the number of weeks in one year and eight weeks) and the answer is £5. 15s. 11d. per week, as in the example.

3. If the capital stock of a railway amount to £4372. 14s. 0d, and there be in it 160 shares, what will be the amount of each share?

In this example I divide by 4, and that quotient by 10, and the quotient thence arising by 4, which is equal to dividing by 160; as 4 times 10 are 40, and 4 times 40 are 160, and the answer is £27. 6s. 7d. for each share.

Question 1.	Question 2.	Question 3.
£. s. d.	£. s. d.	£. s. d.
4)263 10 6	5)347 15 9	4)4372 14 0
7)65 17 7 2 over	6)69 11 1 4	10)1093 3 6
£9 8 2 5 over	2)11 11 10 1	4)109 6 4 2
	£5 15 11	£27 6 7

To find the exact remainder in sums where there are two or more divisors, as in the foregoing ones, the rule is to multiply the first divisor by the last remainder, adding thereto the first remainder, if any, and the product will be the true remainder, as if it had been divided by the long method; thus, in the first of the foregoing examples, I multiply 4, the first divisor, by 5, the last remainder, which produces 20, to which adding 2, the first remainder, the true remainder is found to be 22, which may be proved at leisure.

4. There is a piece of land, having 4 sides, containing 1398 acres, 3 roods, 35 perches, and 240 feet in breadth, it is desired to know how many feet it is in length?

5. There is a piece of timber, the solid contents of which is 600 feet, its length is 40 feet, and its depth 3 feet, it is required to know its superficial contents?

Question 4.

	A.	R.	P.	
4)	1398	3	35	
6)	349	2	38	3 over
10)	58	1	6	2 over
	5	3	12	6 over

Question 5.

	FEET.
3)	600
	200

In the fourth question of the land, first by 4, and the quotient by 6, and the next quotient by 10, which is the same as dividing at once by 240, and the answer is found to be 5 acres, 3 roods, and 12 perches, for the length of the piece of land. In the last question I divide the solid contents of the piece of timber by 3, the depth, and the quotient 200 feet, is the superficial contents, which, if divided again by 40 feet, the length, would give 5 feet for the breadth. In the same manner as the foregoing examples are wrought, division of other denominations may be performed, having respect to the table of quantity belonging to the same. But in this species of division, if the divisor be not a commensurable number, or one which cannot be divided into parts exactly, the division must then be performed by one divisor.

Division also teacheth how to bring small denominations into great ones; but as this part more properly belongs to reduction, I have deferred treating of it till I come to that rule.

REDUCTION.

Reduction points out the way of bringing numbers from one name to another, without altering their value.

EXAMPLE.

Let it be required to reduce £4. to shillings; that is, to express the amount £4. in shillings; or, in other words, to find how many shillings are contained in £4. We multiply the number of pounds by the number of shillings which makes £1; thus—

£.
4
20
—
80
12
—
960 pence
—

There being 20 shillings in a pound, we multiply by that number; the answer is 80 shillings, which is the number contained in £4, and should we wish to reduce the shillings to pence, we multiply 80 by 12, as above, 12 pence being one shilling; the result is 960, which is the number of pence in 80 shillings, or £4.

How many half pence are there in 20 guineas?

GUINEAS.
20
21
—
20
40
—
420
12
—
5040
2
—
10080 { half-pence, equal to 20 guineas.
—

Let it be required to reduce £3. 14s. 7¼d to farthings, that is to the lowest term in the amount.

In reducing from one term to another, where there are denominations between them, it is necessary to reduce successively from the one denomination to the other. Thus, in reducing pounds to farthings, the pounds are brought first to shillings, the shillings are then reduced to pence, and the pence to farthings; and, as in this example, besides the £3, there are 14s. 7¼d., these are to be added at the successive reductions; thus—

```
   £.  s.  d.
   3  14  7¼
  20
  ——
  74 shillings
  12
 ———
 895 pence
   4
————
3581 farthings
————
```

Here, in multiplying the pounds by 20, we include the 14s., making 74 shillings; multiplying these again by 12, to make pence, and including the 7d. we have 895 pence, which are now reduced to farthings, by multiplying by 4, and including the ¼d. we have 3581 farthings. The compound number £3. 14s. 7¼d. is thus reduced to a simple one, namely—3581 farthings.

Reduction ascending is just the reverse of these operations, and is done by division. To turn farthings into pence, divide the number by 4, because there are 4 farthings in one penny. To make pence into shillings, divide by 12, since 12 pence are one shilling, and to convert shillings into pounds, divide by 20, as 20 shillings are one pound.

EXAMPLE.

In 3840 farthings, how many pounds?

```
 FARTHINGS.
  4)3840
    ————
 12)960 pence
    ———
  20)80 shillings
     ——
      4 pounds
     ——
```

THE RULE OF THREE DIRECT.

The Rule of Three Direct teaches, from three numbers or terms given, to find a fourth, which shall bear such proportion to the third, as the second does to the first.

EXAMPLE I.

If 3 lbs. of tea cost 9s., how many pounds may be purchased for 21s.?

State, and work the question as follows:

$$\begin{array}{ccccc} \text{s.} & & \text{s.} & & \text{lbs.} \\ 9 & : & 21 & :: & 3 \\ & & 3 & & \\ \hline & 9) & 63 & & \\ \hline \text{Answer} & & 7 \text{ lbs.} & & \end{array}$$

In this example, the answer wanted is lbs.; the 3 lbs. therefore are made the third term. The answer, also, will be more than this term, since a greater quantity may be bought for 21s. than for 9s., therefore 9s. the smaller of the other two terms, is made the first, and 21s. the greater, the second; then multiplying the second and third terms together, we have 63, which divided by 9, gives 7 lbs. for the fourth, or previously unknown term.

EXAMPLE 2.

If 7 lbs. of tea cost 21s., how much may be purchased for 3s.?

$$\begin{array}{ccccc} \text{s.} & & \text{s.} & & \text{lbs.} \\ 21 & : & 3 & :: & 7 \\ & & & & 3 \\ \hline & & & 21) & 21 \\ \hline & & & \text{Answer} & 1 \text{ lb.} \end{array}$$

If 3 yards of flannel cost 2s. 7½d., what will 28 yards cost?

	yds.		s.	d.		yds.
If	3	:	2	7½	::	28
			12			
			31			
			4			
			126			
			28			
			1008			
			252			
			3)3528			
			4)1176			
			12)294			
			2,0)2,4	6		
Ans.			£1	4	6	

	yds.		yds.		s.	d.
Or, If	3	:	28	::	2	7½
			126		12	
			168		31	
			336		4	
			3)3528		126	
			4)1176			
			12)294			
			2,0)2,4	6		
Ans.			£1	4	6	

If 3½ lbs. of green tea cost 28s. 6d. what will half a hundred weight come to?

Ans. £22. 16s

	lbs.		s.	d.		lbs.
If	3½	:	28	6	::	56
	2		12			2

	lbs.		lbs.		s.	d.
If	3½	:	56	::	28	6
	2		2		12	

PRACTICE.

Practice is a short, easy, and ready method of finding the value of goods, by taking aliquot or even parts, and is usually adopted by persons in business. An aliquot part of any number or quality is one by which the number or quality may be divided, without leaving a remainder. Thus—4 is an aliquot of 20;—7 of 28;—3 of 12.

What is the value of 4260 apples at ¼d. each?

Ans. £4. 8s. 9d.

¼ of a penny (¼)4260 at ¼
12)1065
20)8,8 9
£4 8 9

As an illustration of the peculiar use and advantage of practice, let it be required to find the value of 3567 articles at 3s. 4d. each?

By the usual rules of arithmetic, this question would be performed somewhat similar to the one just performed.

s. d.
3 4 = 40

3567
40
12)142680 pence
2,0)1189,0
£594 10

By the rules of practice, however, we are taught, that as 3s. 4d. is an aliquot part of a pound, namely ⅙, by simply dividing the number of articles by 6, we obtain at once the amount in pounds; thus—

3s. 4d. equal to $\frac{1}{6}$)3567
£594 10

I shall conclude this rule by the following case—When the price is less than a penny, the rule is—If the price be $\frac{1}{4}$d., that is, the fourth part of a penny, divide the given number by 4; if $\frac{1}{2}$ divide by 2; the answer will be in pence, which reduce to shillings and pounds by dividing by 12 and 20. If the price be $\frac{3}{4}$, first find, as above, for $\frac{1}{2}$, and then for $\frac{1}{4}$, adding the two results together; or multiply the given number by 3, the upper figure of the fraction, and divide the product by 4, the under figure; the answer in both cases will be in pence, which reduce, as above, to shillings and pounds.

EXAMPLE.

Find the value of 3526 yards at $\frac{1}{4}$d., $\frac{1}{2}$d., and $\frac{3}{4}$d.

yds. d.
4)3526 at $\frac{1}{4}$
12)881 $\frac{1}{2}$
2,0)7,3 5
£3 13 5$\frac{1}{2}$

yds. d.
2)3526 at $\frac{1}{2}$
12)1763
20)14,6 11
£7 6 11

yds. d.
$\frac{1}{2}$ = 2)3526 at $\frac{3}{4}$
$\frac{1}{4}$ = 2)1763
881 $\frac{1}{2}$
12)2644 $\frac{1}{2}$
2,0)22,0 4$\frac{1}{2}$
£11 0 4$\frac{1}{2}$

yds. d.
3526 at $\frac{3}{4}$
3
4)10578
12)2644 $\frac{1}{2}$
2,0)22,0 4$\frac{1}{2}$
£11 0 4$\frac{1}{2}$

JANUARY.

Weather in Palestine.—Shebat, the fifth month of the civic, and the eleventh of the sacred year. The mountains of Lebanon are covered all the winter with snow, which, when the winds are easterly, affects the whole coast from Tripoli to Sidon with a more piercing cold than is known even in this northern climate. More sheltered places, both north and south of these mountains enjoy a much milder temperature, and a more regular change of seasons. This is especially true of the plain of Jericho, and the whole valley of the Jordan, so that the inhabitants clothe themselves in linen garments at the very time that snow is falling in other parts of Judea. In fact, on the borders of the Lake of Tiberias snow is almost unknown. The "early rains" which commence at the close of October, and continue through November and December are less heavy and less frequent this month, though they do not entirely cease. Snow often falls in Jerusalem to the depth of a foot or more, but does not usually lie long. The ground never freezes, though the pools are occasionally covered with thin ice for a day or two. Though the sky is often overcast and dark in the morning, and occasionally throughout the day, yet the face of the country is verdant and cheerful. The almond and the peach trees blossom, and the olive-tree puts forth its leaves, whilst the groves and meadows are adorned in great profusion with the blossoms of different species of anemone, ranunculus, crocus, tulip, narcissus, hyacinth, lily, and violet.

"He fills the sun with morning light,
He bids the moon direct the night."

265 peaches at 4d. each.

```
           d.
           4 × 5
          10
        ----
        3  4 × 6
          10
     -------
     1 13  4
           2
     -------
     3  6  8  price of 200
     1  0  0  price of  60
        1  8  price of   5
     -------
Ans. £4  8  4
     -------
```

Proof by Practice.

```
       d.
      265
        4
     ----
  12)1060
     ----
   2,0)8,8  4
   ----------
   £4   8   4
   ----------
```

FEBRUARY.

Adar, is the sixth month of the civic year, and the twelfth of the sacred. Snow falls with occasional light frosts, which melt before the first glances of the sun. Although, at the commencement of the month the weather is still rough, yet towards the middle the spring commences, the sun shines out brightly, and the air becomes mild and genial. The rich green of the young corn is much noticed by travellers, and the verdant grass is studded with scarlet poppies of the richest hues. The beans are in flower, the apricot and the plum bloom and orange-trees on the shore of the Lake of Tiberias, are full of blossoms and fruit. Thunder is not unfrequent in the latter half of the month, accompanied by rain, often by high wind, and sometimes by hail. How graphic are the descriptions of the psalmist:—"The Lord causeth the vapours to ascend from the ends of the earth; he maketh lightning for the rain, he bringeth the winds out of his treasures! He giveth snow like wool, he scattereth the hoar-frost like ashes. He casteth forth his ice like morsels. Who can stand before his cold? He sendeth out his word and melteth them: he maketh the wind to blow, and the waters flow."—Psalm cxxxv. 7; cxlvii. 16, 18.

"With hoary frost He strews the ground,
His rain descends with clattering sound."

563 quarters of corn, at £2 15s. per quarter.

Answer £1548. 5s.

MARCH.

Abib, or Nisan, is the seventh month of the civic, and the first month of the sacred year. Much rain continues to fall, and sometimes in torrents this month. The roads or rather tracks are muddy, deep, and slippery; and travelling in the earlier part of this month is inconvenient and disagreeable. This "latter rain" is indispensable to fruitfulness of the corn-fields. The nights continue cold and frosty in the northern and eastern districts about the head of the Jordan, and beyond, and beyond the hills of Gilead, whilst between the ranges of Lebanon snow falls even to the end of the month. The great rains swell the streams into deep and rapid rivers that are sometimes dangerous to ford, and as the snows melt on the mountains towards the close of the month, the Rivers and the Jordan itself, are so swollen as to overflow their banks; then occurs what is called in Scripture the swelling of Jordan.—Josh. iii. 15; Jeremiah xii. 5; xlix. 19; 1 Chron. xii. 15.

By the middle of this month, however, splendid weather is enjoyed, especially in the plains like Sharon and Jericho. No palpable sky is to be seen, but a pure ethereal expanse, untravelled by a single cloud, and a balmy state of atmosphere such as can alone be enjoyed in the east. Every tree by this time is in full leaf. The tall waving cypress delight the eye with their graceful forms and intense verdure, whilst the bloom of the apple and the pear trees add to the beauty of the scene. Barley is sometimes ripe even in the neighbourhood of Jerusalem at the end of March.

"Thy changing seasons He ordains,
Thine early and thy latter rains."

193 bushels of apples, at 2s. 5½d. per bushel.
Answer £23. 14s. 5½d.

APRIL.

Ijar, is the eighth month of the civic, and the second month of the sacred year. The snow has not entirely disappeared from the heights of Lebanon which are sometimes whitened by a fresh fall. The thermometer ranges from 53° to 79° at noon, but owing to the great difference of elevation in various parts of Palestine, very great dissimilarity prevails with regard to temperature. The mornings are often hazy, but the air extremely delightful, and as the day advances the sky is usually serene, and the atmosphere mild and balmy. Showers occasionally fall, but they are soft and refreshing, and the face of nature is kept green and pleasant, the fertile valleys not being yet parched by the summer's sun. The growing corn in various stages of progress give to the cultivated districts a strikingly fine appearance; for the corn-land not being divided by separate enclosures, and unbroken by hedge-rows, may be seen throughout a whole plain, and when agitated from end to end by a most gentle breeze, exhibits the peaceful undulations of the waving grain, which are really beautiful. The time of harvest is determined by the somewhat irregular period of the rainy season. After the rains cease the corn soon comes to maturity. The greater part of the barley crops become ripe, and is gathered in before the close of this month. To the lover of flowers the country now presents a glorious sight, groves of orleanders, with their rich red blossoms are seen everywhere along the streams, whilst the waste ground and the corn fields too, seem as if purposely sown to give fragrance and beauty to the scene.

"He bids the southern breezes blow;
The ice dissolves, the waters flow:
But he hath nobler works and ways
To call the Britons to His praise."

125 bushels of corn at 10½d. per peck.

Answer £21. 17s. 6d.

MAY.

Sivan, is the ninth month of the civic, and the third month of the sacred year. The weather generally in the early part of this month is delightful, and seldom excessively hot, even at noon, whilst the mornings and evenings are delicious indeed. From the end of this month to the middle of September rain is not known in Palestine, and the inhabitants usually sleep on their terraces, under the open canopy of heaven, without danger from exposure to the atmosphere. The country now begins to assume a burnt aspect, particularly in the plain of

Jericho, and the whole valley of the Jordan, where the heat is always the greatest, and the heavy dews are essential to vegetable life. Hence the frequent reference to them as to special blessing (Gen. xxvii. 28; Deut. xxxii. 2; Hosea xiv. 5.) The thermometer ranges from 65° to 85° at noon. May is the great harvest-month of Palestine, and the bulk of the wheat crop is gathered in, as that of barley, the last month. The wheat of Syria and Palestine was valued at Rome, as of a better quality than that of most other countries, and was indeed classed above that of Egypt. The certainty of favourable weather renders the harvest season far less hurried and laborious in Palestine than in Europe.

> "These, as they change, Almighty Father, these
> Are but the varied God. The rolling year
> Is full of Thee. Forth in the pleasing spring
> Thy beauty walks, thy tenderness and love."

506 bushels of barley, at £2. 16s. 4d. per bushel.
Answer £1425. 4s. 8d.

JUNE.

Thamiz, is the tenth month of the civic, and the fourth month of the sacred year. Although the dews are heavy, yet the total absence of rain soon destroys the verdure of the fields, and gives to the whole landscape the aspect of drought and barrenness. The only green objects which remain are the scattered fruit trees and the vineyards. The deep green especially of the broad fig-trees is delightful to the eye amidst the general aridness, whilst the foliage of the olive with its dull greyish hue, scarcely deserves the name of verdure. The temperature daily increases, and in the great valley of the Jordan it becomes so hot that the inhabitants might grow almost any produce of the tropics. The heat now becomes oppressive during the whole of the day, and is felt so even on the mountains; the air is motionless, and a thin mist pervades the whole atmosphere. The early figs, both black and white, are now ripe, and fall as described by the prophet Nahum, (11, 12); also the melons in the valley of the Jordan, and some early grapes. Almonds also ripen in June, and new olives are sometimes gathered before the close of the month. The operations of the harvest are continued in the higher districts, the barley in-gathering preeeding that of the wheat by a week or a fortnight.

"The fragrant the refreshing breeze
Of every flowery bloom
In balmy whispers own, from Thee
Their pleasing odours come."

135 sacks of rice at £16 per sack.

Answer £2160.

JULY.

Ab, or Abib, is the eleventh month of the civic year, and the fifth month of the sacred. Little variation occurs between the weather of this and the preceding month, except that the heat is somewhat increased, the atmosphere remains almost invariably serene, and is without a cloud. One day is almost precisely like the preceding, for the weather continues invariably fine, but the heat of the sun is so great that all the pleasure of travelling is lost. Dates become ripe early this month, and are good to taste, though as a luxury they are considered to be greatly inferior to an apple. But it is as a substantial article of food that the date possesses a relative value which the apple cannot acquire. The fruit of the olive-tree is also ripe, and plums, peaches, nectarines, and grapes which are very far superior to those produced in this country.

Crops of millet, cotton, linseed, and tobacco, are standing in the fields, with occasional small patches of late-sown barley. The drought of the season calls into operation all the modes of artificial irrigation the country possesses, and which are chiefly conformed to those of ancient and modern Egypt. (Deut. xi. 10; Isaiah lviii. 11.)

"The singing birds, the warbling winds,
And waters, murmuring fall,
To praise the First Almighty cause,
With different voices call."

9 cwt. of tobacco, at 2s. 7d. per ℔.
Answer £130. 4s. 0d.

AUGUST.

Elul, is the twelfth month of the civic, and the sixth of the sacred year. The weather continues much like that of the two past months. After the 20th, a number of large and dense clouds usually pass, which are called by the European residents "Nile clouds," the formation of which they attribute to the overflowing of Egypt by its waters.

This is the great fruit season of Syria and Palestine. The olive tree, which grows in all parts of the country, on both sides of the Jordan, in Galilee, in Samaria, in Judea, and all along the coast, now yields its precious berries, which are gathered first by shaking the tree, and then by beating the branches. The oil, so valuable for food, medicine, and many domestic and manufacturing uses, was abstracted by the pressure of the feet (Micah. vi. 15), as the juice of the grapes were expressed by treading. Modern mechanics have supplied more efficient and less laborious processes. Although the vintage is not ripe till October, yet grapes are gathered for eating, as the orthodox Turks only cultivate the vine to supply their tables with fruit, the followers of Mahommed not being allowed to drink, or consequently to make wine, which is only manufactured by Christians.

"Ye flowery plains, proclaim His skill;
Valleys, lie low before His eye:
And let His praise from every hill
Rise tuneful to the neighbouring sky."

105 bottles of wine, at 4s. 6d. per bottle.
Answer £23. 12s. 6d.

SEPTEMBER.

Tisri, is the first month of the civic year, and the seventh of the sacred. The hot season continues, and travellers complain of its oppressive influence. The whole land is parched and arid, the stoney beds of the brooks are dry, the cisterns are nearly empty, and even the fountains fail. So parched are the grass and herbage, that a single spark would set on fire weeds, thorns, and forests, and cause the greatest devastation. Hence carelessness in the use of fire was expressly forbidden, (Exod. xxii. 6.) All nature, physical and animal, seems to languish, and longingly to anticipate the return of the rainy season. It is under these circumstances that the inspired writers so frequently refer to the value of and the refreshment of shade. The heat begins to abate towards the close of the month, and though in the middle of the day travellers cannot be abroad, yet the mornings and evenings are delicious. Pomegranates and mulberries are now ripe, and all kinds of grain not already mentioned, are now carried. Dourra maize, or Indian corn, millet and rice, are all cultivated, and with esculent vegetables, such as lentiles, beans, peas, lupins, &c. are housed for use.

"Well pleas'd the toiling swains behold
The waving yellow crop;
With joy they bear the sheaves away
And sow again in hope."

135 bushels of peas at 10d. per bushel.

Answer £5. 12s. 6½d.

OCTOBER.

Marchesvan, is the second month of the civic year, and the eighth of the sacred. The weather in the early part of this month is serene, and more cool and pleasant than at any time of the year, though at mid-day, in clear weather, the heat is very strong. The vintage takes place, but is vastly different in extent and beauty to the scenes of the Holy Land when it was full of people. The wines are not generally good, the practice of boiling them destroying their character. Clusters of grapes are also dried into raisins. They are dipped into a weak ley, with a small quantity of olive oil, and then spread on the ground, when in six or eight days, according to the dryness of the atmosphere, the raisins are cured. They are then taken, while they are yet warm with the sun, put into jars, pressed down hard, and so preserved for use, or sale. Mists and clouds begin to make their appearance towards the close of the month, when the "early rain," so indispensable to the fruitful year begins. It does not set in suddenly, but by degrees, which gives the husbandman an opportunity to plough and sow his winter crop. The rain mostly comes from the West, or S. W. (Luke xii. 54.) and continues for two or three days at a time falling, mainly in the night, Then the wind veers round to the north or east, and several days of fine weather succeed.

"—— Nor shall the present year
Be more tenacious of her human leaf,
Or spread of feeble life a thinner fall."

153 lbs. of grapes, at 4½d. per lb.

Answer £2. 17s. 4½d.

NOVEMBER.

Chislen, is the third month of the civic, and the ninth of the sacred year. This must be regarded as the first of the rainy months, which are promised as one of the greatest blessings of Divine Providence, expected and desired by a whole people. (Deut. xi. 14; Jer. iii. 2; James v. 7). The days are somewhat cold as the rain continues longer, and the sky is overcast. The trees begin to cast their leaves, and delicate people to use a fire (Jer. xxxvi. 22); the ploughing and sowing commenced in October are continued throughout the present month, which is peculiarly characterized by these operations.

> "Now stir the fire, and close the shutters fast,
> Let fall the curtains, wheel the sofa round;
> And while the bubbling and loud-hissing urn
> Throws up a steam column, and the cups
> Which cheer, but not inebriate, wait on each,—
> So let us welcome peaceful evening in."

50 tons of coals, at £1. 12s. per ton.

Answer £80.

DECEMBER.

Tebeth, is the fourth month of the civic, and the tenth of the sacred year. The rains continue, and indeed are the heaviest through this month, so that all the torrents, rivers and lakes are swollen, and large tracts of country that lie low are inundated. The natives make an alteration in their clothing immediately after the rains begin, but few of them use fire except when the season happens to be unusually severe. This results from the scarcity of fuel, and the poverty of the people. They are obliged to store up the stalks and roots of all plants (Matt. vi. 28, 30), and the dried dung of animals to supply their hearths. The modern discovery of mineral coals in Lebanon, which were quite unknown to the ancients, may lessen this scarcity. The rains have now called forth the powers of life in various plants, especially those of bulbous roots, some of which begin to flower before the end of this month. The grass and herbage too, which had been burnt up by continued drought, now revive, and give a verdant aspect to the late brown and desolate plains. And now, if not before, the Arabs descend with their flocks from the mountains, and hasten to the green pasture of the plains and deserts.

> "We own, O God, thy gracious sway;
> Thy hand all nature hails;
> Seed-time, nor harvest, night nor day,
> Summer nor winter fails."

9 chaldrons of coke, at 1s. 4d. per bushel.

Answer £21. 12s. 0d.

BILLS OF PARCELS.

A Linen Draper's Bill.

yds.		s.	d.	£.	s.	d.
15	at	16	9	12	11	3
23¼	at	2	10½	3	6	10
34	at	4	6	7	13	0
108½	at	1	4	7	4	8
72	at	14	6¼	52	5	6
11	at	1	3¾	0	14	5¼
			Ans.	£83	15	8¼

A Mercer's Bill.

yds.		s.	d.	£.	s.	d.
52	at	3	3½			
89	at	7	6			
1¾	at	5	4¾			
67½	at	29	3			
92	at	8	11¼			
132⅞	at	7	10½			

A Bookseller's Bill.

Books		s.	d.	£.	s.	d.
20	at	10	6			
23	at	3	0			
12	at	6	0			
9	at	2	0			
34	at	1	6			
29	at	2	0			

A Grocer's Bill.

lbs.		s.	d.	£.	s.	d.
18	at	9	6			
57	at	8	0			
79	at	0	7½			
23½	at	1	0¼			
94	at	0	10¾			
105	at	5	9			

A Leather Seller's Bill.

lbs.		s.	d.	£.	s.	d.
34	at	4	6			
156	at	1	6			
342	at	1	8			
96	at	25	0			
18	at	9	2½			
75	at	8	6			

A Butcher's Bill.

lbs.		d.	s.	d.
8¼	at	7¾		
6	at	6½		
26¼	at	9		
9¾	at	10¼		
7	at	8½		
5½	at	11		

A Corn Chandler's Bill.

Bushels.		s.	d.	£.	s.	d.
28	at	8	0			
40	at	5	2			
36	at	1	10½			
83	at	66	0			
12	at	94	6			
63	at	7	1½			

An Oilman's Bill.

		£.	s.	d.		£.	s.	d.
4 gal.	at	0	0	10	qt.			
¼ cwt.	at	8	7	6	cwt.			
65½	at	0	0	3¾				
1 qt.	at		16	6	gal.			
6	at	0	6	3				
32	at	0	0	1¾				

		s.	d.	£.	s.	d.
37⅞	at	2	7¾ .			
42½	at	1	3½ .			
63	at	5	6 .			
112⅜	at	1	2¼ .			
15	at	4	2 .			

		s.	d.	£.	s.	d.
43	at	4	3 .			
14	at	17	4½ .			
39	at	2	10¾ .			
5½ doz.	at	2	6 .			
10 ps.	360 yds.		5¾ .			
4	at		10¼ .			

A BILL OF DISBURSEMENTS.

1847.		£.	s.	d.
April 26.	Laid out for leg of mutton, five shillings and sixpence			
	For fish, two shillings and tenpence			
	For bread and flour, sixteen shillings and nine pence			
	For vegetables, nineteen pence . .			
	For butter, five shillings and four pence farthing			
	For cheese, eggs, and lard, nine shillings and four pence			
	£			

Having paid for all these things, I wish to know how much I shall have left out of a ten pound Bank of England Bill.

A WEEK'S EXPENSES.

1847.		£.	s.	d.
April 19.	Paid the Grocer's Bill . . .	0	10	6
20.	Baker's ditto	0	15	0
21.	Butcher's ditto	0	18	0
22.	4 lbs. candles	0	3	9
23.	The greengrocer's bill . . .	0	4	9
25.	Sundries	0	5	2¼

COMMERCIAL STAMPS.

STAMPS FOR RECEIPTS.

£.		£.	s.	d.
5	and under	10	0	3
10		20	0	6
20		50	1	0
50		100	1	6
100		200	2	6
200		300	4	0
300		500	5	0
500		1000	7	6
1000	and in full of all demands		10	0

N.B. Receipt stamps are not necessary if money be paid by promissory notes, &c., provided the receipt be written on the back of the note.

Persons receiving the money are compellable to pay the duty.

FORM OF RECEIPT.

Received, May 1, 1847, *of Mr. Wilson, Twenty-two Pounds Twelve Shillings and Sixpence, for goods delivered, as per invoice.*

£22 : 12 : 6 JOHN ROSE.

The penalty for giving a receipt without a stamp, or upon a stamp of less value than is proper is from £10 to £20.

BILLS AND PROMISSORY NOTES.

Not exceeding two months after date, or sixty days after sight.								For a longer period.	
	£.	s.		£.	s.	s.	d.	s.	d.
If	2	0	and not exceeding	5	5	1	0	1	6
Above	5	5		20	0	1	6	2	0
	20	0		30	0	2	0	2	6
	30	0		50	0	2	6	3	6
	50	0		100	0	3	6	4	6
	100	0		200	0	4	6	5	0
	200	0		300	0	5	0	6	0
	300	0		500	0	6	0	8	6
	500	0		1000	0	8	6	12	6
	1000	0		2000	0	12	6	15	0
	2000	0		3000	0	15	0	25	0
	3000	0	and upwards			25	0	30	0

Penalty for Post-dating Bills of Exchange, £100.

N.B. Promissory Notes, on Demand, made out of Great Britain, shall not be negotiable in Great Britain, whether they are payable in Great Britain or not, unless they have the above duties.

FORM OF A BILL.

£600. *London, May* 10, 1847.

Two Months after date, pay to me or my order, the sum of Six Hundred Pounds, value received.

To Mr. Joshua Fresh, GEORGE JONES.
Cheapside.

FORM OF A PROMISSORY NOTE.

£290. *London, August* 20, 1847.

Four Months after date, I promise to pay Mr. John Williams or order, the sum of Two Hundred and Ninety Pounds, for value received.

Oxford Street. JOHN RICE.

MISCELLANEOUS QUESTIONS.

It was on the 13th of December, 1846, that Thomas Livesay, Esquire, of Clapton, departed this life, deeply regretted and respected. By his death the poor have lost a kind benefactor, and the uneducated a zealous advocate. His long and useful life was not confined to the sphere of benevolence alone. He was one of the early founders and successful promoters of gas lighting, and filled, for many years, (with singular ability and advantage to the company, and equal honour to himself,) the Deputy Chairmanship of the Chartered Gas Company, and the kind friend of the author of this little work.

If 1 foot of gas cost 2½d., what will 5000 feet cost?

Ans. £52. 1s. 8d.

The contented man is the richest man, and also the happiest man. In earthly things he wishes no more than nature; he can frame his thoughts to his estates, that when he hath a contented heart he cannot want, because he is as free from desire as superfluity. He hath seasonably broken the headstrong restiveness of prosperity, and can manage it at pleasure. Upon him all smaller crosses light like hailstones upon a roof; and for the greater calamities, he can take them as tributes of life and tokens of love; and though his ship be tossed by the waves of adversity, yet he is sure his anchor is fast. If the mines of Peru and the wealth of the Indies were his, he would be no other than he is; not a whit prouder, because he knows contentment is not in things he hath, but in the mind that values them. He hath learned to read himself more than all books, and hath so taken out lessons that he can never forget, "that he who loveth silver shall not be satisfied with silver, nor he that loveth abundance with increase, that is also vanity." Eccles. 5th chap. 10th ver.

IN what part of the Bible is it said, "The Lord hath given, and the Lord hath taken away;" and how long is it since the person lived — to the present — time?

Answer, Job i. 21. He lived above — years since.

EARLY RISING AND LATE HOURS.—One person rises in the morning at half-past nine, another at six. If each live to be fifty years old, the one will have enjoyed sixty-three thousand, eight hundred and seventy-five hours, or two thousand, six hundred and sixty-one days, more than the other. Let us suppose that there are throughout Great Britain, one million, five hundred thousand persons who rise at a quarter past nine, or later. Of these, perhaps, nine hundred and fifty thousand would, if they rose at six, be usefully employed. At this rate, fifty-six thousand three hundred and forty-six millions, eight hundred and seventy-five thousand hours, or six millions four hundred and thirty-two thousand, two hundred and ninety-two years of individual improvement are lost to society, every half century.

Put the whole in figures on your slate.

THE whole number of persons that have ever existed upon the earth since the creation of the world was estimated a few years ago at about 132,000,000,000, and the aggregate population on the surface of the known habitable globe is estimated at eight hundred and ninety-five millions three hundred thousand souls. If we reckon with the ancients that a generation lasts thirty years, then in that space eight hundred and ninety five millions three hundred thousand human beings will be born and die; consequently eighty one thousand seven hundred and sixty must be dropping into eternity every day; three thousand four hundred and seven every hour, or about fifty-six every minute! How awful is the refletion, reader, are you prepared to die. I should like for you to write down on your slate the amount, in figures, of what is stated above, and inform me in what part of the Bible it is written, "Set thy house in order, for thou shalt die, and not live."

It is said that Alexander on his way to Babylon, stopped at Pasargada, in order to visit the tomb of Cyrus, upon which was this humble but significant inscription :—" O man, whosoever thou art, or whencesoever thou comest, I am Cyrus, the founder of the Persian empire: do not envy me this little quantity of earth which covers my body."

Who was the father of Cyrus, and what was his uncle called, and of what nation, in what part of the Bible is he spoken of, and what good act did he do for the Jews, and how long is it since to this date, 1847 ?

Dr. Stonehouse came to the Rev. Mr. Hervey about three hours before he expired. Mr. Hervey urged strongly and affectionately the doctor regarding his eternal interests. The doctor, seeing the difficulty with which he spoke, and finding by his pulse that the pangs of death were then coming on, desired him that he would spare himself. " No," said he, with peculiar ardour ; " doctor, no ; you tell me I have but a few minutes to live ; oh, let me spend them in adoring our great Redeemer !" He then repeated this verse, " Though my heart and flesh faileth, God is the strength of my heart and my portion for ever ;" and he expatiated in a most delightful manner on the words of St. Paul. " All are yours, whether life or death, things present or things to come." " Here," said he, " is the treasure of a Christian ; death is reckoned among the inventory, and a noble treasure it is ! How thankful am I for death, as it is the passage through which I go to the Lord and giver of eternal life, and a noble treasure it is !"

In what year did Hervey die, and how long since to this date, 1847 ?

Water Worship.—In that part of Yarriba, called Ebna, the people worship the god of water, in the following manner. On the top of a certain mountain the yresort to a large rock or tree, which is surrounded by country-pots. To this idol there is a priest who, in the time of dearth or mere scarcity of water, informs the people what kind of sacrifices the idol wants; and all being prepared, the people by hundreds follow the priest with sacrifices. They throw down colar nuts, and, if the nuts open, they regard it as a favourable sign. The priest falls down before it, and says, "Aloring egi," three times, i. e. "send us rain," and the people shout, "Abna tete tete tete!" "he will hear us directly." They afterwards eat their sacrifices, and retire home, confidently expecting rain in answer to their prayers. This probably is a corruption of Moses striking the rock at Horeb. They have also a superstition that out of those wells and ponds which supply them with water for personal use, they must not take any fish; and if any do, it is a sin that must be atoned for by sacrifice. There are many other superstitions and idolatries respecting water among the various tribes of Africans.

THE metropolis is supplied with water by eight companies. This daily supply of the whole amounts to 36,000,000 gallons. and the houses to which this vast quantity of water is distributed are 250,000, an average of 144 gallons to each house.

Suppose I give 3½d. for 1 pipe of water, what will 1000 pipes come to? Ans. £14. 11s. 8d.

FRANKLIN said that a good paymaster is lord of another man's purse. He that is known to pay punctually and exactly to the time he promises, may at any time, and on any occasion, raise all the money his friends can spare. This is sometimes of great use. Next to industry and frugality, nothing contributes more to the rising of a man in the world, than punctuality and justice in all his dealings, therefore never keep borrowed money an hour beyond the time promised, lest a disappointment shut up your friend's purse for ever.

BORROWED five hundred pounds, and paid at different times three hundred and fifty-six pounds seven shillings and eight pence, how much is there due to my friend?

Whatever you have, and wherever you are, be contented and happy. The folly of complaining, "The house is so small, or, this room is so low, &c., and my furniture is very poor after Mr. So-and-So's; or my entertainment is very different from what you have been used to." Remember all this will not improve it, and that those friends who would forsake you for these trifles are not friends indeed, and therefore better lost than kept. What must they feel, if—"Oh! I do not care in the least for these people, but their house is so beautiful, and their dinners so good, that as long as these continue, I shall endeavour to keep in with them." Again, how grating to a husband's or a wife's ear, to hear the other complain before others of any little individual contrariety of taste, with "If I had my will it should be altered." How very much consideration and conformity to each other's taste is requisite to make the married life happy; how must each mind be conformed to indulge, and endeavour as far as possible to take interest and pleasure in the innocent foibles of each other; and endeavour always to treat each other with respect; think well, and there is no fear of acting ill.

If my income is one hundred a year, how much must I spend to lay by ten pounds thirteen shillings and sixpence?

What number of half-pence are there in £426. 10s.?

What number of crowns, shillings, groats, and pence are there in £526.?

How many half guineas are there in £500.?

In 1200 groats how many crowns, half crowns, and sixpences?

Reduce 14280 pence to half crowns, crowns, and pounds.

Bring 174200 groats into crowns and pounds.

At 10½d. per lb. what is the price of 7 cheeses, each weighing 26 lb. 10 oz.?

If 1 ounce of tea cost 6¾d. what will 24 lbs. cost?

If 1 ton of iron cost £23. 6s. 8d. what will 2½ lbs. cost?

What is wine a bottle, holding 3 half pints, at £50 per pipe ?

What quantity of thread can I buy for £50. 0s. 6d., when 3 lbs. cost 8s. 4d. ?

If I lay by 4¾d. a week, what shall I have in 19 weeks 4 days ?

Suppose the gross weight to be 32 c. 2 q. 14 lbs., the tare 116 lb., and the draft 25 lb., how much is the net weight ?

Bought 79 c. 20 lbs. of tobacco, and was allowed for tare 245 lbs., and for draft 56 lbs., required the number of net lbs. ?

Bought spices at 10 guineas per cwt., and sold them at 2s. 0¾d. per lb., what was the gain per cent. ?

What is the interest of £375. 5s. for 2½ years, at 4⅜ per cent. ?

What is the amount of £40. 10s. for 3 years, at 3½ per cent. ?

Find the commission on £345 at 2½ per cent.

If I allow a broker ⅝ per cent., what will his brokerage amount to on £2165. 10s. 6d. ?

Required the discount of £1000, due 70 days hence, at 5 per cent. ?

What is the discount on a bill of £150, which has 60 days to run, at 5 per cent. ?

What will be the compound interest of £650, for 4 years 9 months, at 3½ per cent. per annum ?

A gentleman spends one day with another £1. 7s. 0½d., and at the year's end lays by £340, I demand his yearly income ?

Bought 274 yards of cloth for £217. 9s. 9d., half of which cost me 14s. 6d. a yard, what did the remainder cost me a yard ?

A gentleman left £50 to be distributed in the following manner:—to poor men, each 5s.; to poor women, each 4s.; to poor boys, each 2s. 6d.; to poor girls, each 2s., and that there should be an equal number of each. What was that number?

A poulterer buys 15 geese, at 2s. 9d. each; 11 wild ducks, at 1s. 4½d.; 13 tame ducks, at 1s. 1½d.; 7 hens, at 10½d.; and 4¾ dozen of pigeons, at 3s. 10d. per dozen, how much change should he have out of 5 guineas?

How many yards of broad cloth, at 1s. 1d. per yard ought to be given for 24 c. 3 qr. of wool, at 2s. 2d. per lb.?

If needles be bought for 2s. 6d. a gross, how many may be sold for a penny to gain 20 per cent.?

A debt of £72 is to be paid with an equal number of sixpences, shillings, half crowns and crowns, what is the number of each?

C and D barter, C has 30 c. 3 qrs. of hops, at 4 guineas per cwt., for which D gives C £24. 10s. in cash, and the rest in soap, at 8½d, per ℔., what quantity of soap must C receive?

What is the square root of 179, 136?

What is the square root of $\frac{169}{441}$?

What is the cube root of 9, 938, 375?

What is the cube root of $\frac{512}{3375}$?

The following is a Return to an Order of the Court of Aldermen, dated 9th of March., 1847, for a statement of the annual receipts of Smithfield Market, for the last fourteen years; a statement of the annual expenditure upon the market for the same time, and a statement of the sums expended in the enlargement and improvement of the market, during the whole period.

	Annual Receipts.			Annual Expenditure.			Enlargement Improvement,		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
1833 .	5225	19	0	1509	1	4			
1834 .	5874	13	8	1464	8	3			
1835 .	5964	0	2	1003	16	0	6055	4	0
1836 .	5563	9	1	1613	4	2	4375	12	7
1837 .	5932	3	2	1564	2	9	16777	2	10
1838 .	6335	16	1	6910	11	2½	2837	9	2
1839 .	6439	11	2	3325	7	3½	427	11	0
1840 .	6617	1	2	1523	17	11			
1841 .	6449	0	9	1526	13	0			
1842 .	7201	12	2	1778	15	8			
1843 .	7315	13	5	2247	18	9			
1844 .	7630	5	5	2194	6	1			
1845 .	7446	15	9	1851	1	9			
1846 .	7474	1	2	1939	0	5½	5622	10	0

Chamber of London,
23rd March, 1847.

A. Brown,
Chamberlain.

AN EXAMPLE

TO ILLUSTRATE THE DIFFERENCE, OR SHOW THE BALANCE BETWEEN DEBTOR AND CREDITOR.

Mr. Thomas Catling in Account with Charles Williams.

1847.	DEBTOR.	£.	s.	d.	1847.	CREDITOR.	£.	s.	d.
Jan. 3.	To sundries	4	16	6	Jan. 19.	By bill at sight	18	0	0
15.	To 25 yards of cloth	2	16	4	24.	By brandy, at 30s.	15	16	0
Feb. 3.	To bill returned	18	0	0	Mar. 4.	By sundries	45	9	6
Mar. 16.	To cash lent	35	5	0	April 27.	By cash	50	10	0
April 4.	To 10 gallons rum, at 15s.	7	10	0		By balance	6	12	8
10.	To teas	37	19	6					
19.	To muslin	5	9	0					
May 2.	To sundries	24	11	10					
		£136	8	2			£136	8	2

FORMS OF LETTERS.

FROM A FRIEND IN TOWN TO ANOTHER IN THE COUNTRY.

DEAR SIR,

I AM emboldened by the many protestations of friendship which you have been pleased to manifest; I take the liberty of humbly requesting, that you would endeavour to procure a proper school for my oldest son. I wish him, if possible, to be near you, that I may frequently have the pleasure of hearing a real account of the progress which he makes. Your compliance with the above will be a considerable addition to all your former obligations, and render me,

DEAR SIR,

Your much obliged servant,

THE ANSWER.

DEAR SIR,

ACCORDING to your request, I made every necessary inquiry, and am glad to inform you, that there is a gentleman within two miles of my residence who keeps a boarding-school, and bears a most excellent character; his attention to the young gentlemen under his tuition is remarkable,—his terms are moderate, and his mode of teaching universally approved of; he wisely endeavours to make the arduous task of learning more a pleasure than a toil; corrects with gentleness the several errors of froward dispositions; and instils such noble principles into their young minds, which grow up with them as they advance in years. His first care is to make them write letters with ease and elegance; this he does by causing each to establish a correspondence with another, while a certain day in the week is appropriated for examining their epistles, and every due encouragement given such as excel in their productions.

Should it please my friend to send his son to this school, he may depend upon my constant visits, and a faithful communication of the progress he makes I shall also endeavour to make the young gentleman's holidays as agreeable as possible; and, by showing my affection for the son, prove how much I am his father's

Most obedient servant, &c.

THE FATHER'S REPLY, RETURNING THANKS.

DEAR SIR,

IMPRESSED with a just sense of my friend's good nature and benevolence, I really feel, but cannot possibly express how much I am indebted to him.

Accept my grateful thanks for the kind care and assiduity you have manifested in complying with my request; and believe me, that from the great recommendation you have given me of the school, I shall not only prefer it to any other, but send my son there without further loss of time.

I am, Your's sincerely, &c.

FROM A SON TO HIS FATHER.

DEAR FATHER,

CONSCIOUS of my duty to so worthy a parent, I cannot omit this opportunity of convincing you of my diligence, although my progress should not be found answerable to my intentions; I am now sensible that a proper command of the pen adds a peculiar dignity to a man of business, and as this cannot be acquired under the directions of even the best of masters without a suitable application on my part, and frequent exercise, I shall take care that your expense and indulgence shall not be bestowed in vain.

I am,

Your most dutiful son,

THE ANSWER.

DEAR SON,

EVERY instance of your duty and affection enhances my esteem, and serves to promote my expectation of your future appearance in the world. I admire your proficiency in writing; and hope your progress in other studies is in some measure adequate thereto. Skill in arithmetic and merchants' accounts is founded on reason, but facility of operation, accuracy, and dispatch, depend upon reiterated practice.

As you have the advantage of the best masters, I shall expect every thing from their instructions and industry.

I am, dear son,

Your most affectionate father,

MATHEMATICS.

Mathematics, or the mathematical sciences are divided into—

1. Pure mathematics, containing arithmetic and geometry, which treat only of number and magnitude.

2. Mixed mathematics, which treat of the properties of quantity applied to matter, as astronomy, geography.

3. Speculative mathematics, which contemplate the proportions, relations, &c. of bodies.

4. Practical mathematics, or their application to the practical uses of life.

Geometry is an ancient, perfect, and beautiful science, which enables us to determine the relations and proportions of superfices, and solids.

Superfices consist of figures of three sides, called triangles; of four sides, called quadrangles, squares, parallelograms, and trapeziums; of five sides, called a pentagon; of six sides, called a hexagon; and of many sides, called a polygon.

Superfices are also circles; ovals, or ellipsis; sectors of circles, or parts cut out from the centre; and segments of circles cut off by a strait line, called a chord.

ALGEBRA; OR, ABSTRACT ARITHMETIC.

If, in calculations, we were to substitute letters for known numbers, and operate with them by the signs +, −, ×, and ÷, till, by reasoning, we have acquired such a disposition of the said letters as expresses the result, and nothing but the result, we should simplify and shorten the calculation.

Such, then, is the science called Algebra. We adopt any letters of the alphabet at pleasure for any given numbers, and operate with them by the intervention of signs, till we have the result.

For the sake of precision, it is usual to take the first letters for the known numbers, as, a, b, c, d, &c.; and the unknown numbers from the last letters, x, y, z.

The algebraic signs are as follow:—

$+$ More or add, as, $a+b$, is a plus b, or a added to b.

$-$ Less; as, $a-b$, is a minus or less by b.

$\times$ Multiplied; as, $a \times b$, is a multiplied by b; or ab, is the same.

$\div$ Divided; as $a \div b$, is a divided by b, or $\frac{a}{b}$ is the same and more usual.

$=$ Equal to: as $a=b$, is a equal to b.

$:$ Is to; } as thus, $a : b :: c : d$; that is, as a is to b, so is
$::$ So is; } c to d.

μμ Evolved; or the root extracted.

$\surd$ The root.

When an arithmetician wishes to perform his problem algebraically, he writes down the data of his question as severally equal to a, or b, or c, as he pleases; and the unknown or sought numbers, as x, or y, or z; and then adds, subtracts, multiplies, and divides these, by the signs, as his reason directs, till he arrives at a simple result.

Suppose the joint ages of Eliza and Emily are 23, and that Eliza is three years older than Emily, and their respective ages are required. Put a then $=23$ and $b=3$, and call Eliza's unknown age y, and Emily's z, and then algebraically it will stand,

$$a=y+z$$
$$b=y-z$$

Then, if these are added together, as $+z$ added to $-z$ destroys itself, it will then stand $a+b=2\,y$; and then by dividing by 2, it will be,

$$\frac{a+b}{2}=y \text{ Eliza's age:}$$

and by restoring a and b, it will stand $\frac{23+3}{2}=y$, or $\frac{26}{2}=13$, Eliza's age, and Emily's being $13-3$ will, of course, be 10.

A child, to whom the first four rules of arithmetic and the characters are known, may be made to understand this: and I advise no female or young person to pass it by as a difficulty. A course of algebra may be undertaken after a youth is master of vulgar and decimal fractions.

STATISTICAL CALCULATIONS.

Statistics, are a class of useful facts in reference to the population of countries, the number of births, marriages, and deaths, the general health and diseases, the revenue, wealth, and resources, and various other particulars, which it is of importance to collect. A main object in collecting these particulars is to compare the statistics of one period with those of another; as, for instance, to compare the number of deaths occurring in one year with the number occurring in another, or to compare the general health at one time with what it is at other times, or what it has been in other countries. Statistical calculations are thus of vast national importance, and require to be performed with much accuracy. For the sake of clearness, it is customary to strike a per centage of each kind of facts, and to compare the one with the other. The per centage here, as in other cases, signifies by the hundred. For instance, it may be a question how many persons in the 100 die in the course of a year, and this is spoken of as the number of deaths is, in the first place, compared with the amount of the population, and the proportion of the one to the other is then computed.

Example.—In 1820, the population of England and Wales amounted to 11,957,565, and in 1831 it was 13,840,751. What was the increase per cent. in the 10 years?

In this example we say, as 11,957,565, the population in 1820 is to 100, so is 1,883,186, the increase in ten years, to the answer sought.

```
11957565  :  100  ::  1883186
                          100
                     ---------
          11957565)188318600(50 8-11 per cent.
                    11957565
                    --------
                     68742950
                     59787825
                     --------
                 8 | 955125
                 — | ------- = 8-11ths nearly
                11 | 957565
                     -------
```

It being customary, in statistical calculations, to state fractional parts as decimals, the above answer, according to the method of working in decimal fractions, would be expressed thus, 15.7, meaning 15 and 7-10ths.

A TABLE OF MONEY, WEIGHTS, AND MEASURES,

MENTIONED IN THE SCRIPTURES, DIGESTED IN ALPHABETICAL ORDER.

A bath	9 gallons and 3 quarts
A cubit, common	18 inches
———, king's	21 ditto
———, holy	36 ditto
An ephah	half a bushel and a pottle
A farthing	3 farthings sterling
A finger's breadth	somewhat less than an inch
A firkin	4½ gallons
A foot	12 inches
A furlong	125 paces
A gerah	3 halfpence
A hair's breadth	the 48th part of an inch
A hand's breadth	4 inches
A hin	3 quarts
A homer	14 bushels and 1 pottle
A kab, or cab	1 quart
A log	½ pint
A measure, liquid	1 quart
————, dry	1¼ gallon
A mule's burden	2 hundred weight
An omer	3½ pints
A pace	5 feet
A piece of money	3 halfpence
A penny, or denarius	7½ pence
A pot	1½ pint
A pound of gold	75 pounds sterling
———— silver	£3. 2s. 6d.
———— weight	12 ounces
A reed	6 cubits and a hand's breadth
A sabbath day's journey	6000 paces, or 5 m. 5 ft. 18 p. 1 y
A shekel of gold	15 shillings
———— silver, common	1s. 3d.
———— silver, holy	2s. 6d.
———— weight, common	¼ ounce
———— weight, holy	½ ounce
A span	9 inches
A talent of gold	25,000 pounds
———— silver	187 pounds 10 shillings
———— weight	82 pounds

N.B. The Jews divided their night, which commenced at six o'clock in the evening, and ended at six the next morning, into four watches.

LONDON:
W. H. COMPTON, PRINTER, 55, PADDINGTON ST., MARYLEBONE.